

US-PAT-NO: 6048217

DOCUMENT-IDENTIFIER: US 6048217 A

TITLE: Connecting device for high-voltage cable

DATE-ISSUED: April 11, 2000

INVENTOR-INFORMATION:

|                     |           |       |          |         |
|---------------------|-----------|-------|----------|---------|
| NAME                | CITY      | STATE | ZIP CODE | COUNTRY |
| Kobayashi; Yoshinao | Yokkaichi | N/A   | N/A      | JP      |

ASSIGNEE INFORMATION:

|                               |           |       |          |         |
|-------------------------------|-----------|-------|----------|---------|
| NAME                          | CITY      | STATE | ZIP CODE | COUNTRY |
| Sumitomo Wiring Systems, Ltd. | Yokkaichi | N/A   | N/A      | JP      |

APPL-NO: 08/ 969540

DATE FILED: November 13, 1997

FOREIGN-APPL-PRIORITY-DATA:

|         |          |                   |
|---------|----------|-------------------|
| COUNTRY | APPL-NO  | APPL-DATE         |
| JP      | 8-304691 | November 15, 1996 |
| JP      | 8-304692 | November 15, 1996 |
| JP      | 8-304693 | November 15, 1996 |

INT-CL: [ 07] H01R013/44

US-CL-ISSUED: 439/125

US-CL-CURRENT: 439/125

FIELD-OF-SEARCH: 439/125-128

REF-CITED:

U.S. PATENT DOCUMENTS

|         |                |                  |         |
|---------|----------------|------------------|---------|
| PAT-NO  | ISSUE-DATE     | PATENTEE-NAME    | US-CL   |
| 4443047 | April 1984     | Hofman           | N/A     |
| 5332394 | July 1994      | Frost            | 439/125 |
| 5348486 | September 1994 | Tura, Jr. et al. | 439/125 |
| 5630722 | May 1997       | Mochizuki et al. | 439/125 |

ART-UNIT: 283

PRIMARY-EXAMINER: Paumen; Gary F.

ABSTRACT:

An L-shaped plug connection for connecting a high-voltage cable to a socket terminal having a tubular cable-connecting portion having an inner diameter and a semi-tubular plug connecting portion being provided in a perpendicular direction to the cable-connecting portion and having an open end zone. The end zone has a wall thickness, a pair of opposite rim portions, and an intermediate cavity portion being provided therebetween and having a predetermined dimension in the transverse direction of the cable-connecting portion. The socket terminal also includes a C-shaped elastomeric boot having an L-shaped cavity which includes at least

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6,048,217

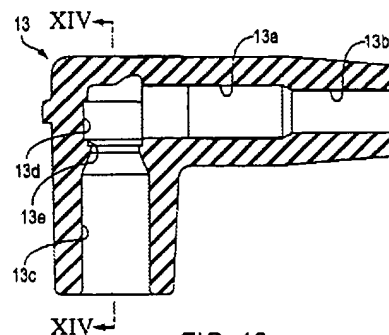


FIG. 13

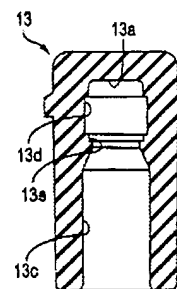


FIG. 14

US-PAT-NO: 5,421,736

DOCUMENT-IDENTIFIER: US 5421736 A

TITLE: Construction for retaining coiled spring of high-voltage terminal engine ignition system

DATE-ISSUED: June 6, 1995

INVENTOR-INFORMATION:

| NAME              | CITY      | STATE | ZIP CODE | COUNTRY |
|-------------------|-----------|-------|----------|---------|
| Imanishi; Hisao   | Yokkaichi | N/A   | N/A      | JP      |
| Nakajima; Keiichi | Yokkaichi | N/A   | N/A      | JP      |
| Fujita; Tadashi   | Yokkaichi | N/A   | N/A      | JP      |

ASSIGNEE INFORMATION:

| NAME                          | CITY      | STATE | ZIP CODE | COUNTRY |
|-------------------------------|-----------|-------|----------|---------|
| Sumitomo Wiring Systems, Ltd. | Yokkaichi | N/A   | N/A      | JP      |

APPL-NO: 08/ 226084

DATE FILED: April 11, 1994

FOREIGN-APPL-PRIORITY-DATA:

| COUNTRY | APPL-NO    | APPL-DATE      |
|---------|------------|----------------|
| JP      | 5-021426 U | April 23, 1993 |

INT-CL: [ 06] H01R013/434;H01R004/48

US-CL-ISSUED: 439/125;439/127 ; 439/893

US-CL-CURRENT: 439/125; 439/127 ; 439/893

FIELD-OF-SEARCH: 439/125; 439/127-130 ; 439/843 ; 439/846 ; 439/893 ; 123/123/169PM

REF-CITED:

U.S. PATENT DOCUMENTS

| DAT-NO  | ISSUE-DATE   | PATENTEE-NAME   | US-CL   |
|---------|--------------|-----------------|---------|
| 1933304 | October 1933 | Bell            | N/A     |
| 5332394 | July 1994    | Frost           | 439/125 |
| 5340323 | August 1994  | Imanishi et al. | 439/125 |

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| FOREIGN-PAT-NO | PUBN-DATE     | COUNTRY | US-CL |
|----------------|---------------|---------|-------|
| 2-33473        | February 1990 | JP      |       |
| 3-47475        | February 1991 | JP      |       |
| 3105072        | May 1991      | JP      |       |
| 5-52175        | March 1993    | JP      |       |

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English Language Abstract of JP 5-52175.  
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U.S. Patent

June 6, 1995

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Fig. 1 PRIOR ART

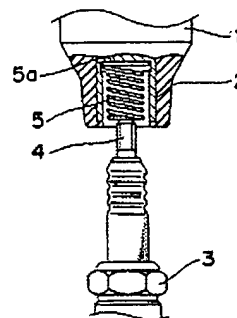
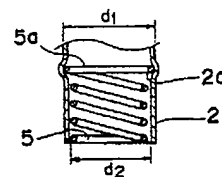


Fig. 2 PRIOR ART



US-PAT-NO: 1509224  
DOCUMENT-IDENTIFIER: UE 1509224 A

TITLE: OCR SCANNED DOCUMENT  
DATE-ISSUED: September 23, 1924

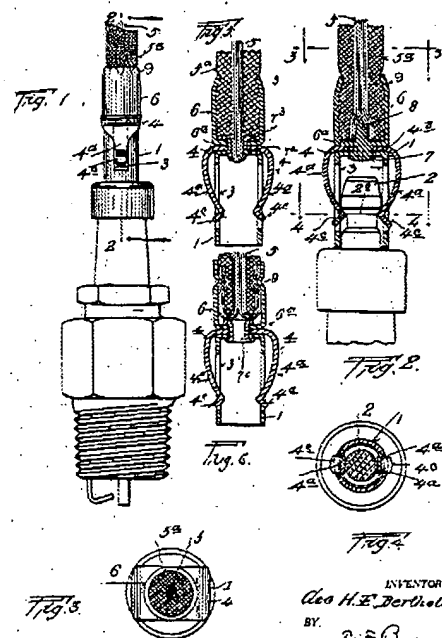
US-CL-CURRENT: 439/430,123/169PH ,313/135

Sept. 23 1924. G. H. E. BERTHOLD 1,509,224 ELECTRIC TERMINAL Filed April 3 1924, 3 6 6q 4 7 9 -4- 71 INVENTOR BY 8 ATTORNEY  
Patented Sept. 23, 1924. 1509224 UNITED STATES PATENT OFFICE. GEORGE H. BERTHOLD, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO RATTAN AUTO SUPPLY CO., OF BLOOMFIELD, NEW JERSEY, A CORPORATION OF NEW YORK. ELECTRIC TERMINAL.  
Application filed April 3, 1924. It may concern: Be it known that I, GEORGE H. E. BERTHOLD, a citizen of the United States, and resident of East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful improvements in Electric Terminals, of which the following is a specification. The object of my invention is to provide a simple and efficient terminal or attachment device adapted to be secured to insulated electrical conductors and to be readily connected with and detached from an electrode, post or other element of an electric circuit, 15 having means to make good electrical contact with the latter and be maintained in a desired position thereon to avoid danger of becoming detached or making poor connection. 20 In carrying out my invention I provide a tubular member or ferrule having slots and adapted to fit upon or receive an electrode or other electric circuit terminal, a spring clip associated with said ferrule and having resilient spaced arms adapted to pass through said slots to engage the electrode, with means to attach said ferrule to an electric conductor. My invention also comprises novel details 30 of improvement that will be more fully hereinafter set forth and then pointed out in the claims. Reference is to be had to the accompanying drawings forming a part hereof, 35 wherein Fig. 1 is a side view of a spark plug equipped with my improved terminal, on an exaggerated scale; Fig. 2 is a section on line 9-9, in Fig. 1; 40 Figs. 3 and 4 are sections respectively on lines 3-3, and 4-4, in Fig. 2; and Figs. 5 and 6 are sectional details of modifications. Similar numerals of reference indicate corresponding parts in the several views. At 1 is a sleeve or ferrule open at one end adapted to fit over or receive an electrode, post or other electric terminal 2. The sleeve or ferrule 1 is shown slotted on opposite sides, at 3, and at 4 is a clip having one or more spring arms 41, preferably two opposing arms, adapted to pass through the slots 3 to engage the electrode or terminal 2. The cross bar or base portion 4b of clip 4 is secured over the closed outer end of sleeve 1923. Serial No. 629,500 or ferrule 1 and said parts are attached to an electric conductor 5. In the example illustrated a sleeve 6 is provided with a stud or projection 7 that extends through register holes in clip 4 and ferrule 1, the inner end of said stud being riveted over to secure the parts 1, 4 and 6 securely together so that the base 4b of the clip is securely clamped between the closed outer end of ferrule 1 and the closed base or end 65 61, of sleeve 6. In Fig. 2 the sleeve 6 is shown provided with an interior tapered projection 8 which enters the cable wires of the conductor 5 to make electrical contact therewith, the insulation 51 of the conductor 5 fitting within the sleeve 6 to retain the sleeve, on the insulation the free end of the sleeve may be crimped or dented into the insulation, as shown at 9, or secured in any other desired way. 115 Instead of having a solid stud or projection 7 extending from sleeve 6, a stud or projection 71, may extend from ferrule 1 to secure the parts 4 and 6 thereto, as illustrated in Fig. 5. Instead of utilizing projection 80 8 to make contact with the electric cable the latter may be secured to either the ferrule 1 or sleeve 6 in any desired manner. In Fig.

Sept. 23, 1924.

G. H. E. BERTHOLD  
ELECTRIC TERMINAL  
Filed April 3, 1924

1,509,224



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